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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,447	02/10/2004	Hyung-Guen Lee	04-02	3700
22443 7590 02/12/2008 LAW OFFICE OF MONICA H CHOI P O BOX 3424 DUBLIN, OH 430160204			EXAMINER HERNANDEZ, NELSON D	
			ART UNIT 2622	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/776,447	<b>Applicant(s)</b> LEE, HYUNG-GUEN	
	<b>Examiner</b> Nelson D. Hernández	<b>Art Unit</b> 2622	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 January 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 4-14 and 16-27 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1, 2, 4, 5, 7, 9-14, 16, 17, 19 and 21-27 is/are rejected. y 2/6/08
- 7) ☒ Claim(s) 6, 8, 18 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

1. The Examiner acknowledges the amended claims filed on January 8, 2008.

**Claims 3 and 16** have been amended. **Claims 3 and 15** have been canceled.

### *Response to Arguments*

2. Applicant's arguments, see page 9, lines 9-17, filed January 8, 2008, with respect to the rejections of **claims 1, 13 and 25** under 35 USC § 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of newly found prior art. This Office Action is made **Non-Final**.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1, 2, 13, 14, 25 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Acharya, US Patent 6,269,181 B1.**

**Regarding claim 1**, if the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. The claim preamble must be read in the context

of the entire claim. Therefore the intended use "for luminance noise filtering" was not considered as a limitation since is stated as an intended use in the preamble (the claims merely claims determining luminance values but does not goes into any details of luminance noise filtering). See MPEP § 2111.02.

Acharya discloses a method for luminance noise filtering, comprising: inputting a region of pixel data from an image sensor (Acharya discloses the use of a digital camera 330. This inherently discloses the use of an image sensor since and image sensor is expected to be present in a digital camera. See col. 6, lines 34-46; col. 8, lines 47-64); determining a virtually filtered luminance from a first processing of said region of pixel data and without using other pixel data for a pixel location within the region (Acharya discloses calculating a median of the luminance of the pixels in a block of pixels surrounding a particular pixel to be calculated; col. 4, line 19 – col. 5, line 46; col. 6, line 34 – col. 7, line 23); and determining a reference luminance for the pixel location from a second processing of said same region of pixel data and without using other pixel data (Acharya discloses that for Red and Blue pixels perform a processing that for example if the raw pixel is a Blue pixel, to calculate the missing Red would first calculate the median of the Green pixels surrounding said Blue pixel (The Examiner is reading the median of the Green pixels surrounding said Blue pixel as the Reference luminance for the pixel location) then, would calculate the median of the Green pixels around the Red pixels that surrounds said blue pixel to compare the difference between the median of the Green pixels surrounding the Blue pixel with the median of the Green pixels around the Red pixels surrounding the Blue pixel to select as the missing Red

value the median of the of the Green pixels around the Red pixels surrounding said blue pixel that is closest compared to the median of the Green pixels surrounding the Blue pixel; col. 6, line 34 – col. 7, line 23) (See also col. 3, lines 20 – col. 5, line 46; col. 6, line 34 – col. 7, line 23).

**Regarding claim 2**, Acharya discloses that the second processing includes the steps of: determining interpolated color components (i.e. interpolating Green color components) for the pixel location from said region of pixel data (as discussed in claim 1, Acharya discloses that for Red and Blue pixels perform a processing that for example if the raw pixel is a Blue pixel, to calculate the missing Red would first interpolate the value of the Green pixel in that Blue pixel by calculating the median of the Green pixels surrounding said Blue pixel (The Examiner is reading the median of the Green pixels surrounding said Blue pixel as the Reference luminance for the pixel location) then, would calculate the median of the Green pixels around the Red pixels that surrounds said blue pixel to compare the difference between the median of the Green pixels surrounding the Blue pixel with the median of the Green pixels around the Red pixels surrounding the Blue pixel to select as the missing Red value the median of the of the Green pixels around the Red pixels surrounding said blue pixel that is closest compared to the median of the Green pixels surrounding the Blue pixel; col. 6, line 34 – col. 7, line 23); and determining the reference luminance for the pixel location from the interpolated color components (The Examiner is reading the median of the Green pixels surrounding said Blue pixel as the Reference luminance for the pixel location) (Col. 6, line 34 – col. 7, line 23).

**Regarding claim 13**, claim 13 recites the apparatus claim for the method in claim 1. Therefore, limitations can be found in claim 1 since Acharya discloses the apparatus performing the method in claim 1 (See fig. 3).

**Regarding claim 14**, limitations can be found in claim 2.

**Regarding claim 25**, limitations can be found in claim 1.

**Regarding claim 26**, limitations can be found in claim 2.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 4, 10, 16, 22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Acharya, US Patent 6,269,181 B1 in view of Laney, US Patent 5,668,932.**

**Regarding claim 4**, Acharya discloses selecting a final luminance value depending on an adaptive luminance but does not explicitly disclose selecting between the virtually filtered luminance and the reference luminance as a final luminance of the pixel location depending on an adaptive luminance.

However, Laney teaches the concept of determining the luminance of a particular pixel (the Examiner is reading this as the Reference luminance of the pixel) that belongs to a region having a plurality of pixels and comparing a calculated average luminance of the region of pixels (the Examiner is reading the calculated average luminance of the

region of pixels as the virtually filtered luminance of the region of pixel data) to the determined luminance of said particular pixel to adjust the luminance of the pixel when it's luminance is brighter or dimmer compared to the average luminance of the region (this suggests the use of selecting the luminance of the pixel based on an adaptive luminance since the luminance is selected based on a comparison between the calculated luminance of the pixel and the calculated luminance of the region) (See figs. 2-4; col. 1, line 31 – col. 2, line 24).

Therefore, taking the combined teaching of Acharya in view of Laney as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Acharya by selecting between the virtually filtered luminance and the reference luminance as a final luminance of the pixel location depending on an adaptive luminance. The motivation to do so would have been to preserve the overall original luminance of the image in all the pixels thus improving the effectiveness of the system by performing corrections tailored for different images by calculating said correction for every image.

**Regarding claim 10**, the combined teaching of Acharya in view of Laney as discussed and analyzed in claim 4 teaches that the adaptive luminance is indicated by the reference luminance (Acharya discloses using the reference luminance (the calculated green luminance based on the median luminance of the green pixels surrounding the Blue color to determine the luminance value based on a comparison with the median luminance of the green colors around the red pixels surrounding said blue pixel; col. 3, lines 20 – col. 5, line 46; col. 6, line 34 – col. 7, line 23).

**Regarding claim 16**, limitations can be found in claim 4.

**Regarding claim 22**, limitations can be found in claim 10.

**Regarding claim 27**, limitations can be found in claim 4.

**7. Claims 5, 7, 11, 17, 19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Acharya, US Patent 6,269,181 B1 in view of Laney, US Patent 5,668,932 and further in view of Gindele, US Patent 6,937,772 B2.**

**Regarding claim 5**, the combined teaching of Acharya in view of Laney fails to teach determining a threshold value from the adaptive luminance; selecting the virtually filtered luminance if an absolute of a difference between the virtually filtered luminance and the reference luminance is less than or equal to the threshold value; and selecting the reference luminance if the absolute of the difference between the virtually filtered luminance and the reference luminance is greater than the threshold value.

However, Gindele teaches a method for removing noise form digital images wherein a pixel of interest (reference luminance) and a local neighborhood of pixels (virtually filtered pixels) located about the pixel of interest are identified; calculating a difference pixel value for pixels in the local neighborhood of pixels based on the absolute difference between the value of the pixel of interest and the individual values of pixels included in the local neighborhood of pixels; using the absolute difference values to calculate a noise reduced pixel value; replacing the value of the pixel of interest with the noise reduced pixel value; wherein a comparison is made between the absolute difference and a threshold value (being a function of the values of pixels included in the local neighborhood) and using only the values of pixels included in the local



neighborhood for which the corresponding absolute difference pixel values are less than the threshold value to calculate the noise reduced pixel value (See col. 9, line 44 – col. 11, line 26).

Therefore, taking the combined teaching of Acharya in view of Laney and further in view of Gindele as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Acharya and Laney by determining a threshold value from the adaptive luminance; selecting the virtually filtered luminance if an absolute of a difference between the virtually filtered luminance and the reference luminance is less than or equal to the threshold value; and selecting the reference luminance if the absolute of the difference between the virtually filtered luminance and the reference luminance is greater than the threshold value. The motivation to do would have been to perform more efficiently noise reduction in digital images as suggested by Gindele (Col. 2, line 66 – col. 3, line 4).

**Regarding claim 7**, the combined teaching of Acharya in view of Laney and further in view of Gindele as discussed and analyzed in claim 5 teaches that the adaptive luminance is determined from an average reference luminance for a predetermined region of pixel data (Laney discloses using the average luminance of the region around a predetermined pixel to be adjusted; col. 1, line 31 – col. 2, line 24).

**Regarding claim 11**, the combined teaching of Acharya in view of Laney and further in view of Gindele as discussed and analyzed in claim 5 teaches that the virtually filtered luminance is determined by averaging a respective pixel data multiplied with a respective weighting coefficient for each pixel location of the region (Gindele discloses

calculating the average luminance of the local neighborhood of pixels (virtually filtered pixels) located about the pixel of interest and correcting the pixels using a weighting factor to correct the pixel (Col. 9, line 44 – col. 11, line 41). This teaches that the virtually filtered luminance is determined by averaging a respective pixel data multiplied with a respective weighting coefficient for each pixel location of the region). Grounds for rejecting claim 5 apply here.

**Regarding claim 17** limitations can be found in claim 5.

**Regarding claim 19**, limitations can be found in claim 7.

**Regarding claim 23**, limitations can be found in claim 11.

**8. Claims 9 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Acharya, US Patent 6,269,181 B1 in view of Laney, US Patent 5,668,932 and further in view of Koyanagi, US Patent 5,880,782.**

**Regarding claim 9**, the combined teaching of Acharya in view of Laney fails to teach that the adaptive luminance is indicated by an auto exposure gain for the image sensor.

However, indicating an adaptive luminance by an auto exposure gain of the image sensor is well known in the art as taught by Koyanagi. Koyanagi teaches a camera (Fig. 1) that perform luminance correction based indicated by a gain correction which is determined using an average luminance of the image and a reference luminance (Note in fig. 1 that the adaptive luminance depends from the gain value from the exposure controller 16, since the gain form the exposure controller is feedback to

the image signal that is being processed by blocks 6, 7, 12, 13 and 14) (Col. 4, lines 6+; col. 7, line 13 – col. 9, line 20).

Therefore, taking the combined teaching of Acharya in view of Laney and further in view of Koyanagi as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching of Acharya and Laney by having the adaptive luminance indicated by an auto exposure gain for the image sensor. The motivation to do so would have been to obtain a proper luminance and reference values to expose better the imaging device as suggested by Koyanagi (Col. 10, lines 40-51).

**Regarding claim 21**, limitations can be found in claim 9.

**9. Claims 12 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Acharya, US Patent 6,269,181 B1 in view of Laney, US Patent 5,668,932 and further in view of Raffy, US Patent 7,139,022 B1.**

**Regarding claim 12**, the combined teaching of Acharya in view of Laney fails to teach that the image sensor is part of a hand-held image pick-up device having minimized line memory capacity.

However, processing luminance in a handheld image pick-up device having minimized line memory capacity is notoriously well known in the art as taught by Raffy. Raffy teaches a digital camera (See fig. 1) comprising an image sensor (Fig. 1: 22) to capture an image of an object, said camera further comprises a line buffer (Fig. 1: 30) to store seven lines of pixels to further perform luminance processing to the stored pixel data in the line buffer (Col. 5, line 35 – col. 6, line 44; col. 13, lines 16-30). Raffy also

discloses that the size of the buffer 30 would depend of the applications so it can be smaller or larger (Col. 5, lines 46-51; col. 13, lines 16-30).

Therefore, taking the combined teaching of Acharya in view of Laney and further in view of Raffy as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching of Acharya and Laney by having the image sensor is part of a hand-held image pick-up device having minimized line memory capacity. The motivation to do so would have been to reduce the size and cost of making the apparatus while maintaining the quality of the images as suggested by Raffy (Col. 1, lines 19-32; col. 5, lines 46-51; col. 13, lines 16-30).

**Regarding claim 24**, limitations can be found in claim 12.

***Allowable Subject Matter***

10. **Claims 6, 8, 18 and 20** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

**Regarding claim 6**, the main reason for indication of allowable subject matter is because the prior art fails to teach or reasonably suggest that the adaptive luminance is determined from an overall brightness of a previous image, including all of the limitations of claims 1, 4 and 5.

**Regarding claim 8**, the main reason for indication of allowable subject matter is because the prior art fails to teach or reasonably suggest that the threshold value is

greater when the adaptive luminance is lower, including all of the limitations of claims 1, 4 and 5.

**Regarding claim 18**, the main reason for indication of allowable subject matter is because the prior art fails to teach or reasonably suggest that the adaptive luminance is determined from an overall brightness of a previous image including all of the limitations of claims 13, 16 and 17.

**Regarding claim 20**, the main reason for indication of allowable subject matter is because the prior art fails to teach or reasonably suggest that the threshold value is greater when the adaptive luminance is lower, including all of the limitations of claims 13, 16 and 17.

### ***Conclusion***

12. Because New Grounds for rejections have been presented to reject unamended **independent claims 1, 13 and 25**, this Office Action is made **Non-Final**.

### ***Contact***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson D. Hernández whose telephone number is (571) 272-7311. The examiner can normally be reached on 9:30 A.M. to 6:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Nelson D. Hernández  
Examiner  
Art Unit 2622

NDHH  
February 7, 2008



LIN YE  
SUPERVISORY PATENT EXAMINER